Multi-function Tester (TC-V2.12k)

1 Overview

1.1 Introduction



① – 160x128 TFT display

② – Multi function key

③ – Transistor test area

④ – Zener Diode test area

⑤ – IR receiver window

⑥ – Micro USB Charging Interface

⑦ – Charge indicator LED

1.2 Features

TC-V2.12k is a TFT graphic display Multifunction Tester.

- Transistor Tester
  - Automatic detection of NPN and PNP bipolar transistors, N-channel and P-channel MOSFETs, JFETs, diodes (including double diodes), N- and P-IGBTs, resistors (including potentiometers), inductors, capacitors, thyristors, triacs and battery (0.1-4.5V)
  - Automatic detection of zener diode（0.01-30V）
  - Self test with automatic calibration
- IR decoder
  - Support Hitachi IR coding
  - IR waveform display
  - Infrared receiving instruction
- Other
  - Measurement results using TFT graphic display(160x128)
  - One key operation
  - Auto Power Off(Timeout Settable)
  - Built-in high capacity rechargeable Li-ion Battery
  - Li-ion Battery voltage detection
  - Support Chinese and English

Warning: Built-in Li-ion Battery, it is strictly prohibited the tester immersed in water, or near a heat source!

Warning: For your personal safety, please strictly comply with the use of Li-ion Battery specifications and precautions!

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2 Operating Instructions

2.1 Key operational definitions

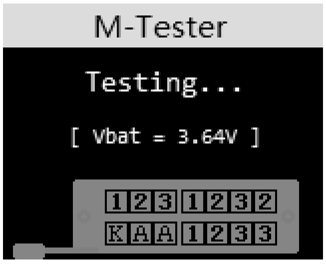
Multi-function key has two actions:

- Short press: Press the key and not less than 10 ms, release key within 1.5 seconds
- Long press: Press the key more than 1.5 seconds

2.2 Power on

In the power off state, short press the multifunction key, the tester is turned on and automatically measured.

- Power on & measurement interface



2.3 Detect transistor

In the power off state or the test is completed, put the test element into the transistor test area of test seat, and press the locking handle, short press the multifunction key, the tester automatically measure, graphical display of measurement results when testing is complete.

Warning: Always be sure to **DISCHARGE** capacitors before connecting them to the tester! The tester may be damaged before you have switched it on!

Warning: We do not recommend using the tester to measure the battery! The battery voltage must be less than 4.5V, otherwise the tester may be damaged!

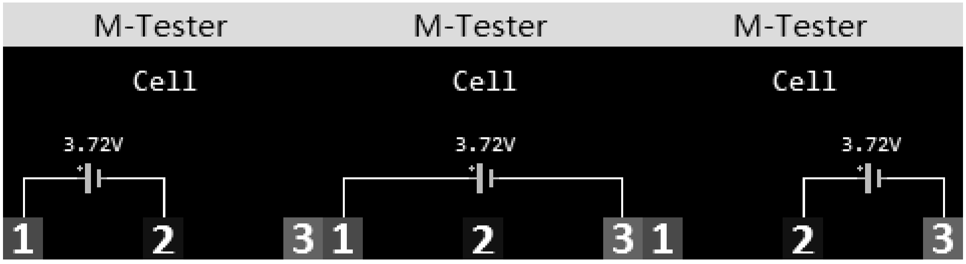
- Component placement

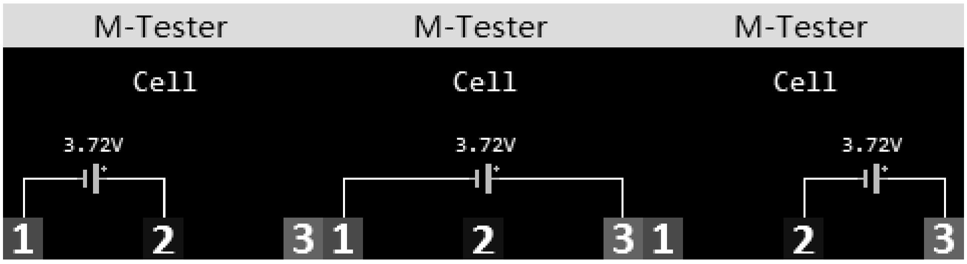
  Test seat are divided into transistors and zener diode test area, detailed in 1.1 Description.

- No, unknown, or damaged part

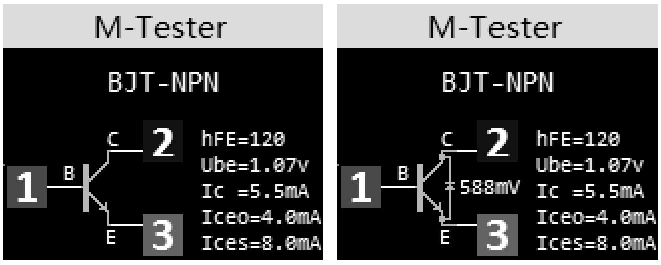


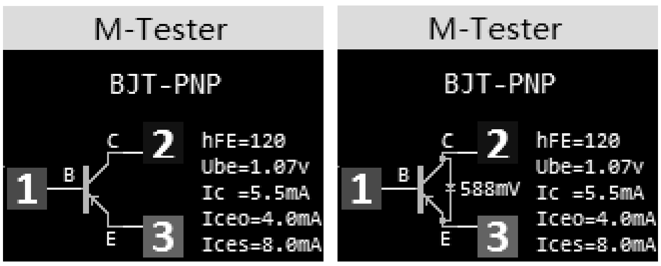
- Battery



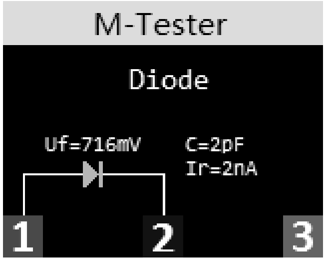


- BJT(Bipolar Junction Transistor)

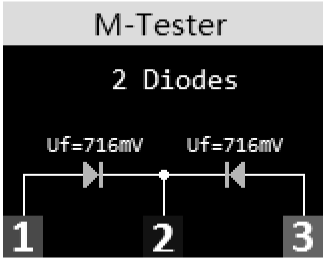


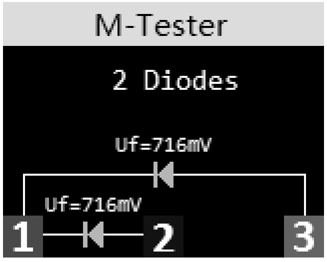


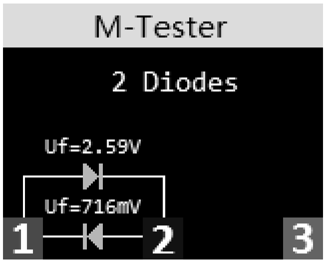
- Diode

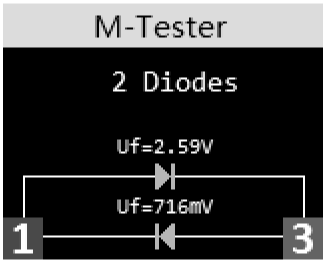


- 2 Diodes

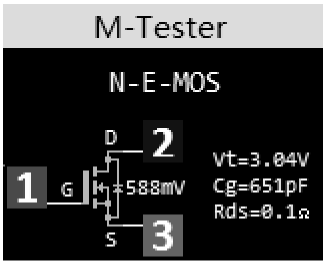


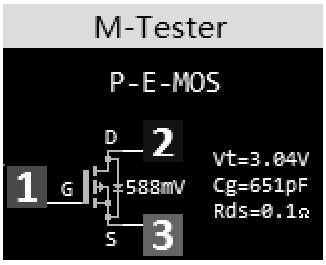


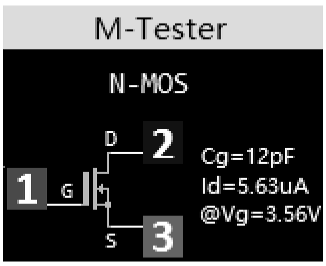


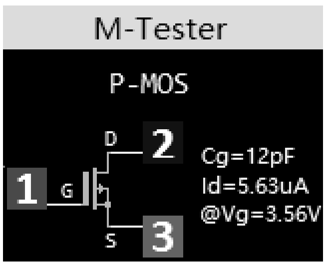


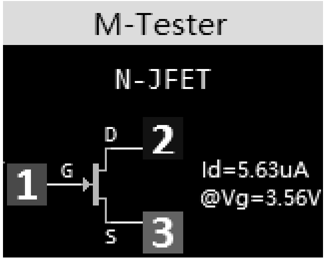
- MOSFET

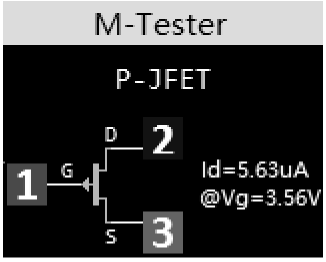


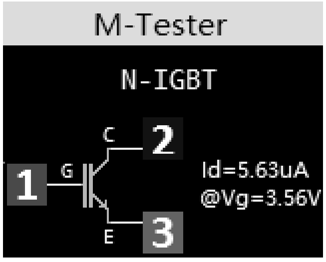


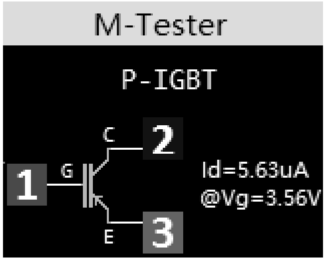




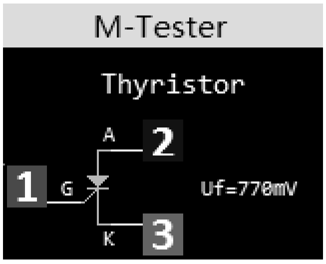




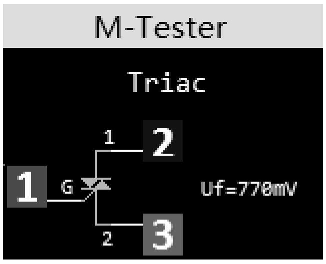




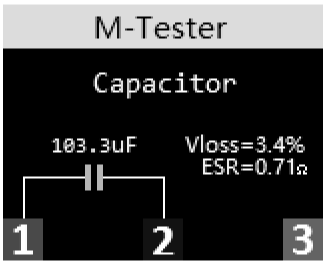
- Thyristor



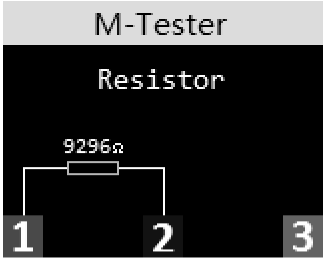
- Triac

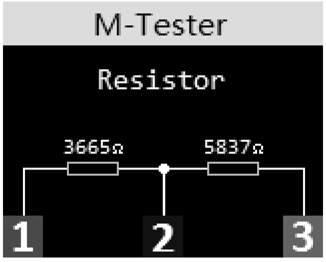


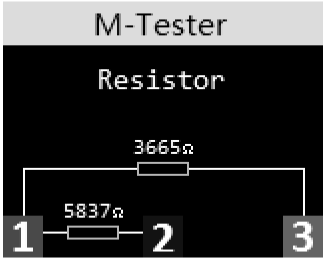
- Capacitor



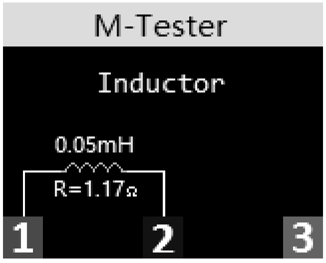
- Resistor







- Inductor



2.4 Selftest

Short all three Probes, short press the multifunction key, the tester will be automatically calibrates itself.

In addition to the calibration process when prompted disconnect external wiring short(Isolate the probes), without the need for other operations.

- Calibrating



- Isolate the probes



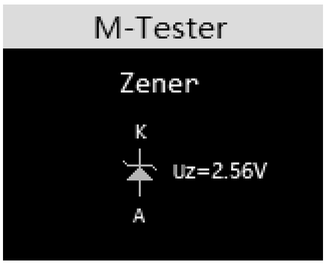
- Selftest End



Warning: Do not carry out other operations in the calibration process, so as not to affect the calibration accuracy!

2.5 Detect Zener diode

In the power off state or the detection is completed, put the Zener diode into the Zener diode test area of test seat, and press the locking handle, short press the multifunction key, the tester automatically measure, graphical display of measurement results when testing is complete.



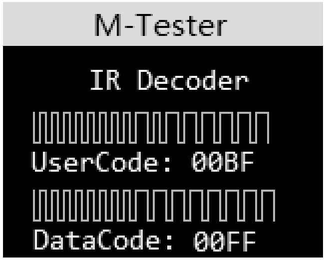
Warning: Do not put the component into transistor test area, otherwise it is impossible to test zener diode!

2.6 IR decoder

After the component detection is completed, the infrared remote control at the tester "IR" test hole, press the remote control key, the tester will be display the user code & data code and the corresponding infrared waveform after the successful decoding.

If decoding failure, the tester cannot display the user code and data code.

The dot at the top right corner to indicate whether it has received the remote control infrared data, red represents infrared data is being received, blue represents decoding success.



Information：The IR decoder only support Hitachi IR format.

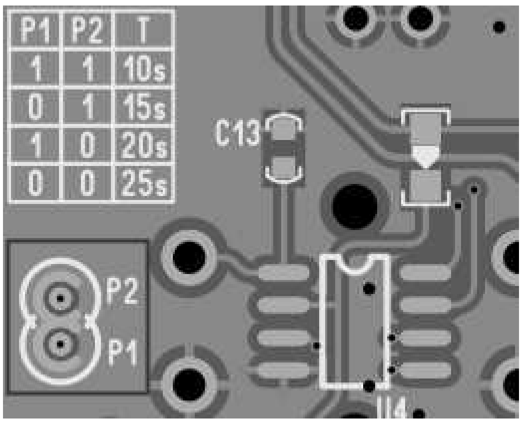
2.7 Power off

The Multifunction Tester with automatic shutdown and manual shutdown.

- Automatic shutdown

  When the component detection completed or IR decoding completed and after reaching the automatically shut down time, the tester automatically shut down.

  Automatic shutdown time can be set by the hardware jumpers, timeout support for 10s, 15s, 20s and 25s. Factory set to 20s.



Warning: Adjust the automatic shutdown time required to open the housing, and use an electric soldering iron solder the jumpers.

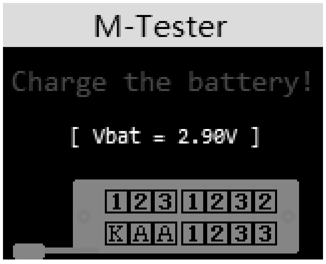
Attention：Please do ESD protection!

- Manual shutdown

  Long press the multifunction key to force a shutdown in any state, while the measuring element is included.

2.8 Built-in Li-ion Battery voltage measurement

The built-in Li-ion Battery voltage is measured before detection, when the battery voltage is less than 3.0V will force shutdown, then please charging.



2.9 Charging the Battery

The tester has a standard Micro USB interface, please use an external 5V power supply or USB power charging.

Information：Red LED indicates is charging, green LED indicates charging is complete.

Warning: Charging input voltage up to 6V, do not exceed the top voltage, or it will damage the tester, and could cause the battery to explode!

3 Performance Parameters

Multifunction Tester can automatically identify elements and automatic detection of pin layout, and automatic switching range.

The main performance parameters are as follows:

Component	Range	Parameter Description
BJT	-	hFE(DC Current Gain), Ube(Base-Emitter Voltage), Ic(Collector Current), Iceo(Collector Cut-off Current (IB=0)), Ices(Collector short Current), Uf(Forward Voltage of protecting diode) ③
Diode	Forward Voltage <4.50V	Forward Voltage, Diode Capacitance, Ir(Reverse Current) ②
Double Diodes		Forward Voltage
Zener Diode	0.01-4.50V (Transistor test area)	Forward Voltage, Reverse Voltage
	0.01-30V (Zener Diode test area)	Reverse Voltage
MOSFET	JFET	Cg(Gate Capacitance), Id(Drain Current) at Vgs(Gate to Source Threshold Voltag), Uf(Forward Voltage of protecting diode) ④
	IGBT	Id(Drain Current) at Vgs(Gate to Source Threshold Voltag), Uf(Forward Voltage of protecting diode) ④
	MOSFET	Vt(Gate to Source Threshold Voltag), Cg(Gate Capacitance), Rds(Drain to Source On Resistance), Uf(Forward Voltage of protecting diode) ④
Thyristor	Igt(Gate trigger current)<6mA	Gate trigger voltage
Triac		
Capacitor	25pF-100mF	Capacitance, ESR(Equivalent Series Resistance), Vloss ①
Resistor	0.01-50MΩ	Resistance
Inductor	0.01mH-20H	Inductance, DC Resistance ⑤
Battery	0.1-4.5V	Voltage, Battery Polarity

Note①: Iceo, Ices, Uf displayed only when effective

Note②: Diode Capacitance, Ir(Reverse Current) displayed only when effective

Note③: Displayed only when has protecting diode

Note④: ESR, Vloss displayed only when effective

Note⑤: Measurement of inductors with resistance below 2100Ω

4 FAQ

Question	Cause	Solution
Cannot power on	Built-in Li-ion Battery is dead	Charging the Li-ion Battery, charging methods see section 2.9
Inaccurate measurements	Inaccurate calibration parameters	Please re-calibration, see section 2.4

5 Packing List

Tester x1, User’s manual x1.

